What is claimed is:

1. A system for performing parallel liquid chromatography comprising:

a microfluidic device defining a plurality of chromatographic separation columns, a plurality of sample inlet ports, a mobile phase inlet port, and an eluate port;

a frame;

a first plate affixed to the frame;

a second plate movably affixed to the frame; and

a sample inlet seal movably affixed to the frame, wherein the sample inlet seal may be moved independently of the second plate;

wherein the first plate and second plate are adapted to compressively secure the microfluidic device;

wherein the sample inlet seal is adapted to seal the plurality of sample inlet ports ; and

wherein any of the first plate and the second plate are adapted to engage at least one of the mobile phase inlet port and the eluate port.

2. The system of claim 1 further comprising a first compression element affixed to the frame and the top seal plate.

3. The system of claim 2 further comprising a second compression element affixed to the frame and the sample inlet seal plate.

4. The system of claim 1 wherein:

the first plate defines a first surface and a second surface;

the second plate is disposed adjacent to the first surface; and

the sample inlet seal is disposed adjacent to the second surface.

5. The system of claim 1 wherein the first plate defines a first surface and a second surface and the second plate and the sample inlet seal are disposed adjacent to the first surface.

6. The system of claim 1 further comprising a guide rail affixed to the frame and the second plate.

7. The system of claim 1 further comprising a guide rail affixed to the frame and the sample inlet seal.

8. The systems of claim 1 wherein the sample inlet seal is capable of movement with at least two degrees of freedom.

9. The system of claim 1 wherein the microfluidic device further comprises a plurality of eluate ports.

10. The system of claim 1 wherein the microfluidic device further comprises a plurality of mobile phase inlet ports

11. The system of claim 1 wherein the microfluidic device is substantially planar.

12. The system of claim 1 wherein the microfluidic device comprises a plurality of device layers.

13. The system of claim 12 wherein at least one of the device layers is a stencil layer.

14. The system of claim 12 wherein any device layer of the plurality of device layers is a polymer layer.

15. The system of claim 14 wherein each device layer of the plurality of device layers is an adhesiveless polymer layer.

16. The system of claim 14 wherein the polymer layer is a vinyl-based polymer.

17. The system of claim 14 wherein the polymer layer is a polyolefin.

18. The system of claim 14 wherein the polymer layer is polypropylene.

19. A method for performing parallel liquid chromatography, the method comprising the steps of:

providing a microfluidic device having a plurality of chromatography columns, a mobile phase inlet, a plurality of sample inlets, and an eluate outlet;

providing a chromatography instrument adapted to operate the microfluidic device, the instrument having a mobile phase outlet, an eluate inlet, a moveable plate, and a sample inlet seal;

compressing at least a portion of the microfluidic device with the moveable plate;

supplying a first at least one sample to the plurality of sample inlets;

sealing the plurality of sample inlets with the sample inlet seal; and

chromatographically separating the first at least one sample.

20. The method of claim 19 wherein the sealing step is performed independently of the compressing step.

21. The method of claim 19, further comprising the steps of:

flushing the microfluidic device;

releasing the sample inlet seal while maintaining compression of at least a portion of the device with the moveable plate;

supplying a second at least one sample to the plurality of sample inlets; and

chromatographically separating the second at least one sample.

22. The method of claim 19 wherein the first at least one sample includes a plurality of samples.

23. The method of claim 19, further comprising the steps of:

supplying pressurized mobile phase to the microfluidic device;

depressurizing the microfluidic device; and

releasing the sample inlet seal to expose the plurality of sample inlets.

24. The method of claim 19 wherein the compression step includes any of mating the mobile phase outlet to the mobile phase inlet and includes mating the eluate inlet to the eluate outlet.

25. The method of claim 19, further comprising the step of detecting at least one property of an eluate stream from a chromatography column of the plurality of chromatography columns.

26. The method of claim 25 wherein the detecting step utilizes ultraviolet absorbance detection.

27. The method of claim 25 wherein the detecting step utilizes mass spectroscopy.

28. The method of claim 19, further comprising the step of generating a chromatogram.

29. The method of claim 28, further comprising the step of displaying the chromatogram.

30. The method of claim 28, further comprising the step of archiving the chromatogram in a data file.

31. The method of claim 19, further comprising the steps of:
releasing the first seal plate and the sample inlet seal plate; and
removing the microfluidic device.

32. The method of claim 31, further comprising the step of flushing the instrument.

33. A method for performing parallel liquid chromatography, the method comprising the steps of:
selecting a first multi-channel microfluidic separation device from a plurality of multi-channel microfluidic separation devices;
placing the first device in an instrument;
forming a temporary seal between the instrument and the first device;
performing a plurality of parallel HPLC separations;
releasing the temporary seal; and
removing the first device from the instrument.